We claim:

1. A method for transmitting data in a multiple antenna communication system having N transmit antennas, said method comprising the step of:

transmitting a legacy preamble having at least one long training symbol, and at least one additional long training symbol on each of said N transmit antennas, each of said long training symbols having a plurality of subcarriers, wherein said subcarriers are grouped into a plurality of subcarrier groups, and wherein each subcarrier group is transmitted on a different transmit antenna in a given time interval.

2. The method of claim 1, wherein said grouped is based on a blocking technique.

3. The method of claim 1, wherein said grouped is based on an interleaving technique.

4. The method of claim 1, wherein each of said transmit antennas transmits a total of N long training symbols.

5. The method of claim 4, wherein said subcarrier groups transmitted by a given transmit antenna are varied for each of the N long training symbols transmitted by said given transmit antenna.

6. The method of claim 5, wherein after transmission of said N long training symbols by each of said N transmit antennas, each of said N transmit antennas has transmitted each subcarrier of said long training symbols only once.

7. The method of claim 1, wherein a sequence of each of said long training symbols on each of said N transmit antennas are orthogonal.

8. The method of claim 1, wherein said legacy preamble further

comprises at least one short training symbol.

9. The method of claim 1, wherein said legacy preamble further comprises at least one SIGNAL field.

10. The method of claim 1, wherein said legacy preamble is an 802.11 a/g preamble.

11. The method of claim 1, wherein each of said long training symbols are orthogonal in the frequency domain.

12. The method of claim 1, wherein N is two and wherein said transmitting step further comprises the step of transmitting a legacy preamble having at least one long training symbol and one additional long training symbol on each of said two transmit antennas, wherein half of the subcarriers of the long training symbol are in a first subcarrier group and the remaining half of the subcarriers of the long training symbol are in a second subcarrier group

13. The method of claim 1, whereby a lower order receiver can interpret said transmitted data.

14. The method of claim 1, further comprising the step of transmitting a field indicating said number N of transmit antennas.

15. A transmitter in a multiple antenna communication system, comprising:

N transmit antennas for transmitting a legacy preamble having at least one long training symbol, and at least one additional long training symbol on each of said N transmit antennas, each of said long training symbols having a plurality of subcarriers, wherein said subcarriers are grouped into a plurality of subcarrier groups, and wherein each subcarrier group is transmitted on a different transmit antenna in a

given time interval.

16. The transmitter of claim 15, wherein said grouped is based on a blocking technique.

17. The transmitter of claim 15, wherein said grouped is based on an interleaving technique.

18. The transmitter of claim 15, wherein each of said transmit antennas transmits a total of N long training symbols.

19. The transmitter of claim 18, wherein said subcarrier groups transmitted by a given transmit antenna are varied for each of the N long training symbols transmitted by said given transmit antenna.

20. The transmitter of claim 19, wherein after transmission of said N long training symbols by each of said N transmit antennas, each of said N transmit antennas has transmitted each subcarrier of said long training symbols only once.

21. The transmitter of claim 15, wherein a sequence of each of said long training symbols on each of said N transmit antennas are orthogonal.

22. The transmitter of claim 15, wherein said legacy preamble further comprises at least one SIGNAL field.

23. The transmitter of claim 15, wherein said legacy preamble is an 802.11 a/g preamble.

24. The transmitter of claim 15, wherein each of said long training symbols are orthogonal in the frequency domain.

25. The transmitter of claim 15, wherein N is two and wherein said two transmit antennas transmit a legacy preamble having at least one long training symbol and one additional long training symbol on each of said two transmit antennas, wherein half of the subcarriers of the long training symbol are in a first subcarrier group and the remaining half of the subcarriers of the long training symbol are in a second subcarrier group

26. The transmitter of claim 15, whereby a lower order receiver can interpret said transmitted data.

27. A method for receiving data on at least one receive antenna transmitted by a transmitter having N transmit antennas in a multiple antenna communication system, said method comprising the steps of:

receiving a legacy preamble having at least one long training symbol and an indication of a duration of a transmission of said data, and at least one additional long training symbols on each of said N transmit antennas, each of said long training symbols having a plurality of subcarriers, wherein said subcarriers are grouped into a plurality of subcarrier groups, and wherein each subcarrier group is transmitted on a different transmit antenna in a given time interval; and

deferring for said indicated duration.

28. The method of claim 27, wherein said method is performed by a SISO receiver.

29. The method of claim 27, wherein said indication is transmitted in a SIGNAL field that complies with the 802.11 a/g standards.

30. A receiver in a multiple antenna communication system having at least one transmitter having N transmit antennas, comprising:

at least one receive antenna for receiving a legacy preamble having at least one long training symbol and an indication of a duration of a transmission of

said data, and N-1 additional long training symbols on each of said N transmit antennas, each of said long training symbols having a plurality of subcarriers, wherein said subcarriers are grouped into a plurality of subcarrier groups, and wherein each subcarrier group is transmitted on a different transmit antenna in a given time interval; and

means for deferring for said indicated duration.